Actividades Práticas

PFCH

ACTIVIDADES PRÁTICAS PFCH

1.ECG

2.Pulso / frequência cardíaca. (em repouso e depois de esforço físico)

3. Pressão sistólica e pressão diastólica. (em repouso)

3.Oximetro (nível de saturação do oxigénio no sangue).

4.Rapidez dos reflexos.

5. Volume de ar de expiração (normal e máximo)

6.Acuidade visual.

7. Teste cores.

8. Audiograma.

9.Equilíbrio corporal. Exercício de equilíbrio apoiado apenas num pé (com e sem auxílio da visão).

AWESOME HUMAN BODY SCIENCE EXPERIMENTS for Kids

40 STEAM

PROJECTS TO EXPLORE HOW THE BODY WORKS

ORLENA KEREK, MD
WITH GALEN AND DANTE KEREK

Illustrations by Kate Francis

ROCKRIDGE
PRESS

READY, STEADY, PULSE!

DIFFICULTY LEVEL: EASY
TIME: 10 MINUTES

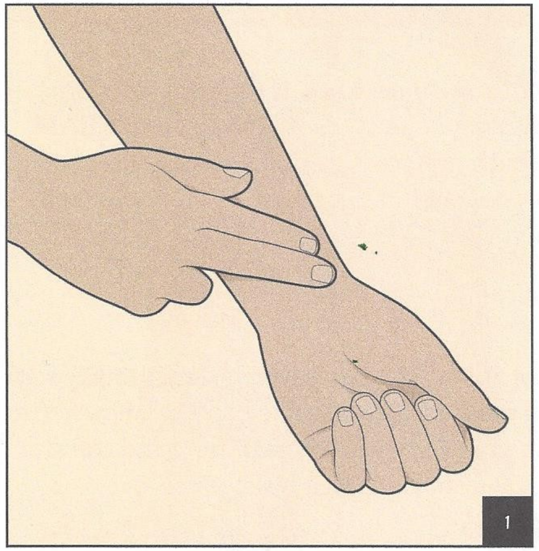
MATERIALS

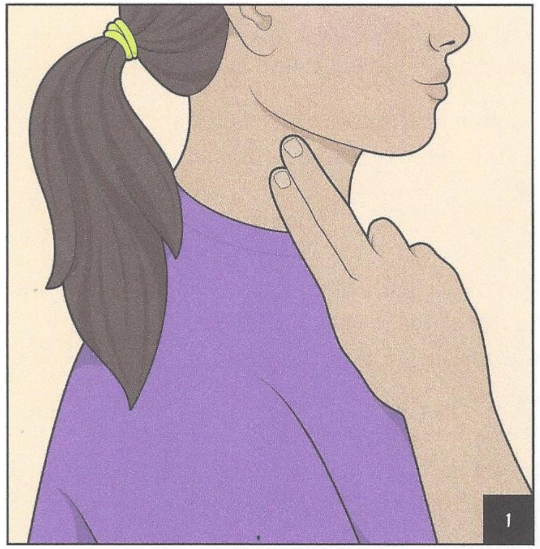
- Stopwatch or phone timer
- Notebook
- Pencil

When you are playing sports, you might hear a lot about pulse. Your pulse is the beating of your heart throughout your body. You can feel it on your wrist, your chest, or your neck. In this activity, you'll learn about your pulse and how it applies to athletics.

STEPS

1. Find your pulse. Put a finger on the inside of your wrist until you feel a beat. If you can't find it there, press your finger to the side of your neck or press your hand to the left side of your chest.
2. Once you can feel your pulse under your finger or hand, set your timer for 1 minute (60 seconds). While the timer is going, count how many times you feel your heartbeat.
3. Write down the number of beats you felt. Your count will probably be somewhere between 70 and 115.
4. Do some physical activity! Run around, do jumping jacks, play with a jump rope—whatever gets you out of breath. Do this activity for about 5 minutes. It's okay if you need to take a few short breaks.
5. Now, set your timer for 1 minute and count your pulse again. Is there a difference this time? Is it faster or slower?
6. Write your second pulse count next to the first count. Compare the two. Which one is faster? Why do you think that is?





7. Wait 10 minutes so that you can catch your breath and rest. After you have calmed down, count your pulse one final time. Has it gone back down? Do you think its speed has to do with the physical activity you did?

HOWS & WHYS: Your heart is a big, strong muscle that pumps blood around your body. Your pulse is your heartbeat. It speeds up when you are active because the harder you run and play, the more oxygen your muscles need. That means your heart beats faster to get the oxygen pumping into your blood.

STEAM CONNECTION: In math, comparing two numbers means noticing the difference in value. The blood pounding through your arteries created an echo of your heartbeat in your wrist. You're doing basic math by comparing different numbers to see how your pulse changes.

Try This! Do this experiment with a few friends or family members. Record how each of their pulses changes after some physical activity. Is everyone's pulse the same?

BALANCING IS CHALLENGING

DIFFICULTY LEVEL: EASY
TIME: 20 MINUTES

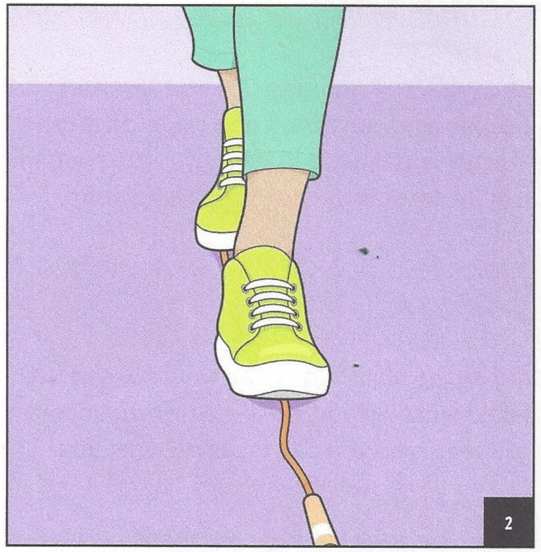
MATERIALS

- Jump rope
- Notebook
- Pencil
- Stopwatch or phone timer

? How hard is it to stand on one leg? Balance is a difficult skill that many parts of our body help us achieve. Your muscles, your eyes, and even your ears help you when you try to balance!

STEPS

1. Lay the jump rope on the ground, stretched out in a straight line.
2. Try to walk along on the jump rope without falling off. First, try walking normally. Then try walking with your arms stretched out on either side of your body. You can also try running along the rope. Make observations in your notebook. How hard was it to balance on the jump rope? Was it easier with your arms out, or when you were moving faster?
3. Next, try balancing on one leg. How long can you stay on only one leg? Time yourself with a stopwatch. Now try it with your arms out. How long were you able to balance with your arms by your sides compared to how it was with your arms out? Jot down your observations.
4. Balance on one leg again. This time, stare fixedly at one thing that isn't moving, like a blade of grass or a stone on the ground. Does staring at one thing help you stand on one leg longer than if you just look anywhere?



5. Now for the ultimate trial! Stand on the jump rope while balancing on one leg. Try with your arms by your sides, and then stretched out. Try focusing your eyes on one point to help your balance.

HOWS & WHYS: Your inner ear helps you balance by telling your brain where up and down are. The inner ear has three canals, or tubes, that are full of liquid. When your head tilts one way, the liquid sloshes to one side. This sloshing moves tiny hairs in the canals and tells your brain which way is down.

STEAM CONNECTION: Have you seen ballet dancers spin and spin without falling over? They balance by using a technique called spotting. They look at one spot and keep their head still while their body turns. At the last possible moment, they spin their head around and look at the same spot again.

Try This! Try spinning and twirling around without looking at any one spot. What happens? Do you fall over? Now try spotting, like a ballet dancer.

FILL YOUR LUNGS

DIFFICULTY LEVEL: MEDIUM
TIME: 30 MINUTES

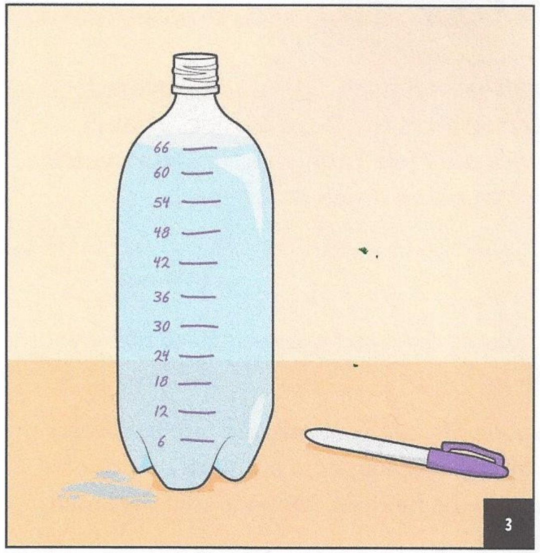
MATERIALS

- 2-liter bottle, empty
- Water
- Permanent marker
- Length of rubber tubing, at least 2 feet long
- Measuring jug
- Large container, like the bath or kitchen sink

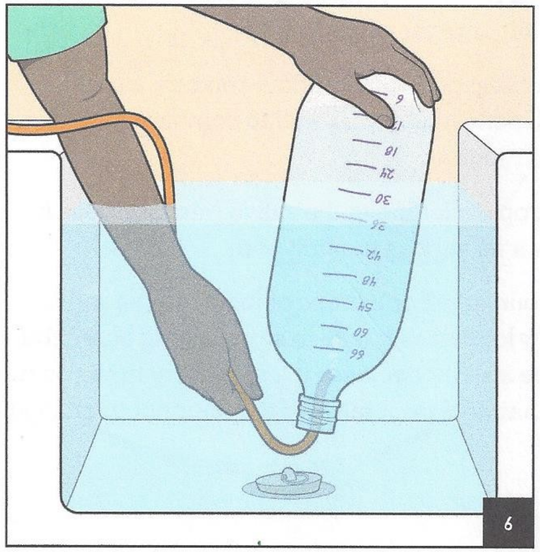
? When you take a deep breath, you can feel your chest stretching. Your chest makes itself bigger to fit the air you are breathing in. In this activity, you will explore your **LUNG CAPACITY**—the maximum amount of air you take into your lungs at one time.

STEPS

1. First, prepare your bottle. Pour about ¾ cup (approximately 6 fluid ounces) of water into the bottle. With your marker, draw a line at the top of the water, then label it "6 ounces."
2. Add another ¾ cup of water to the bottle. Draw another line at the top of the water. Label that line "12 ounces."
3. Repeat this process of adding ¾ cup of water and marking the water level until you completely fill the bottle.
4. Fill up your bath or sink with water.
5. Cover the top of the bottle with your hand so no water can escape. Then turn the bottle upside down and put it in the bath or sink. Don't remove your hand from the opening until it is completely underwater. When you pull your hand out, there shouldn't be any air in the bottle.
6. Without taking the bottle out of the water, insert the rubber tube into the bottle opening. Hold one end of the tube in your hand while you put the other end into the bottle. Make sure no water gets into the tube.
7. Now take a deep breath and blow as hard as you can into the tube. Blow until you don't have any air in your lungs.



3



6

8. There is now air in the bottle. The lines will tell you how much. Did you blow out the equivalent of 6 ounces of air? Or more?

HOWS & WHYS: Your lung capacity is the amount of air you can breathe in and out of your lungs. Lung capacity affects how quickly you get oxygen to your body. Athletes train regularly to increase their lung capacity, which makes it easier for them to breathe when they are competing in races or games.

STEAM CONNECTION: **When people want to go deep under the sea, they use special cylinders of air called scuba tanks to help them breathe. As they go deeper and deeper, there's more pressure on them from the sea above. This pressure affects the air in the tanks and how the gases are absorbed in their bodies. They must be careful not to injure themselves by swimming back to the surface too quickly.**

Try This! Try doing five super-deep breaths every day for a week, then repeat the lung capacity experiment. Has your lung capacity increased in any noticeable way? Does the water level go down more, or is it the same as before?

Over One Million Janice VanCleave Books Sold

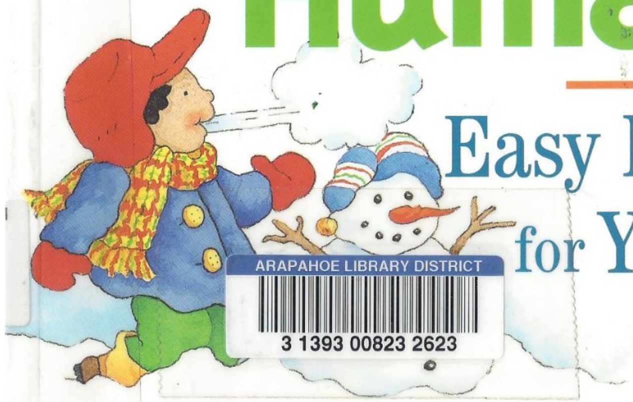
JANICE VANCLEAVE'S

Play and Find Out about the Human Body

Easy Experiments for Young Children

I wonder . . . Why doesn't my hair hurt when it gets cut?

I wonder . . . How does my back bend?

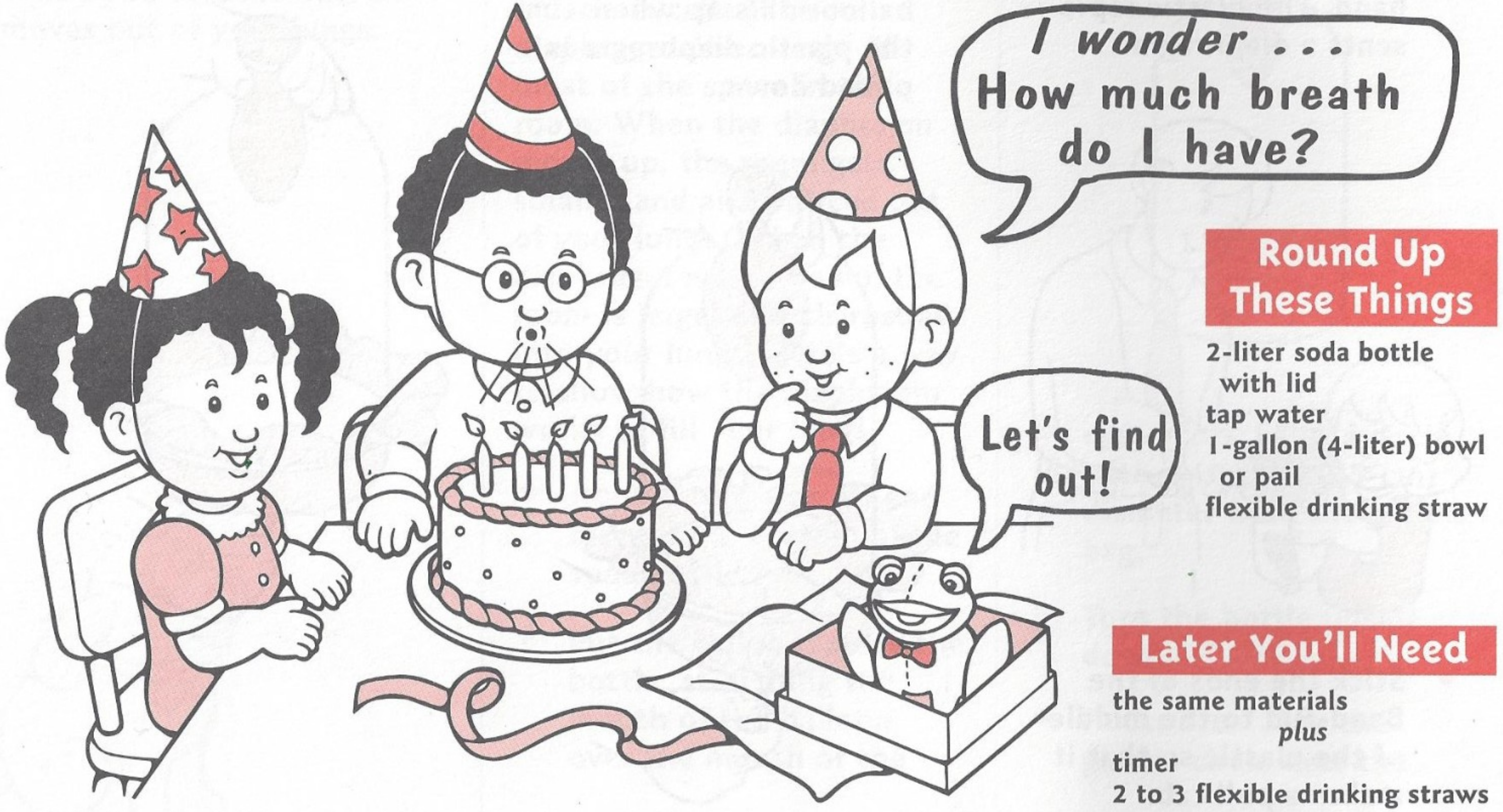

I wonder . . . Why can I see my breath when it's cold?

I wonder . . . Why do my fingertips have ridges?

JANICE VANCLEAVE SCIENCE FOR FUN

ARAPAHOE LIBRARY DISTRICT
3 1393 00823 2623

Filled


I wonder . . .
How much breath
do I have?
Let's find out!

Round Up These Things

2-liter soda bottle
with lid
tap water
1-gallon (4-liter) bowl
or pail
flexible drinking straw

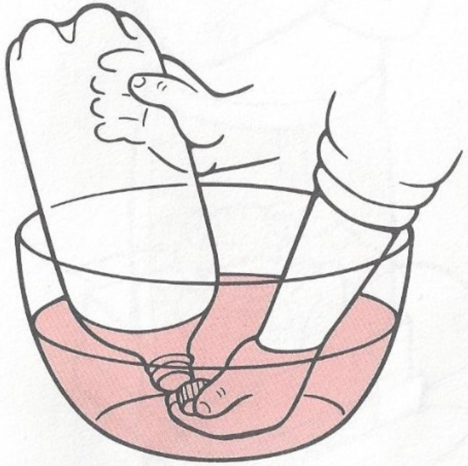
Later You'll Need

the same materials
plus
timer
2 to 3 flexible drinking straws

1. Fill the bottle to overflowing with water and screw on the lid.

2. Fill the bowl about half full with water.

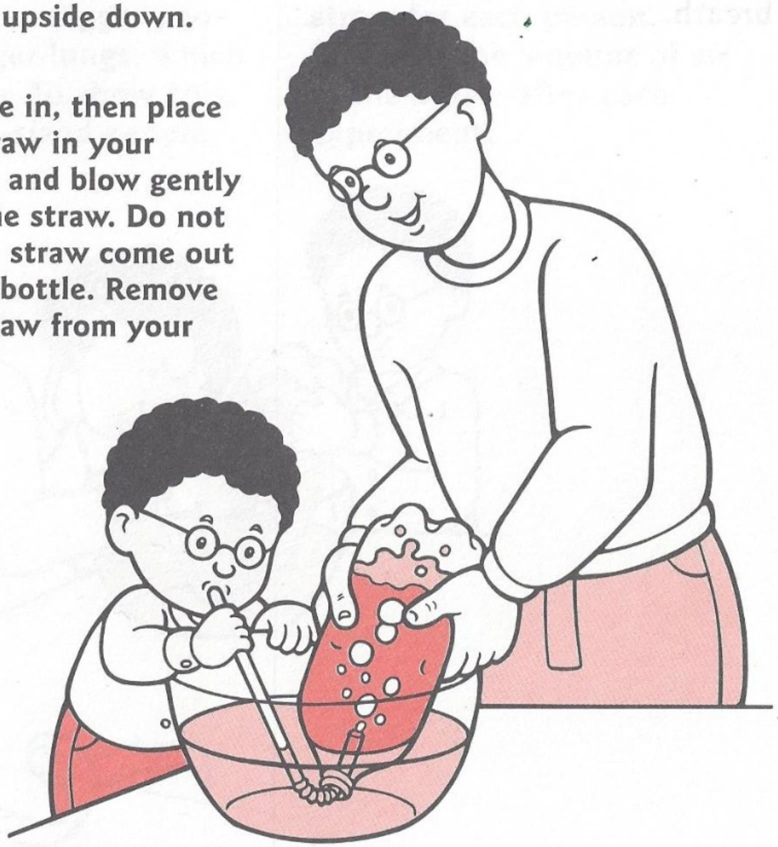
3. **Adult Step** Turn the bottle upside down in the bowl of water so that the mouth of the bottle is under water, then take off the lid.



4. Place the short end of the straw into the neck of the bottle.

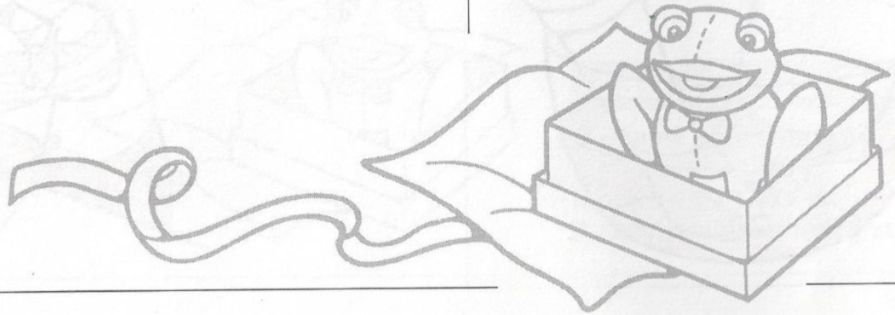
5. **Adult Step** Hold the bottle upside down.

6. Breathe in, then place the straw in your mouth and blow gently into the straw. Do not let the straw come out of the bottle. Remove the straw from your mouth before you breathe in again. All the air that you breathe out collects at the top of the bottle.



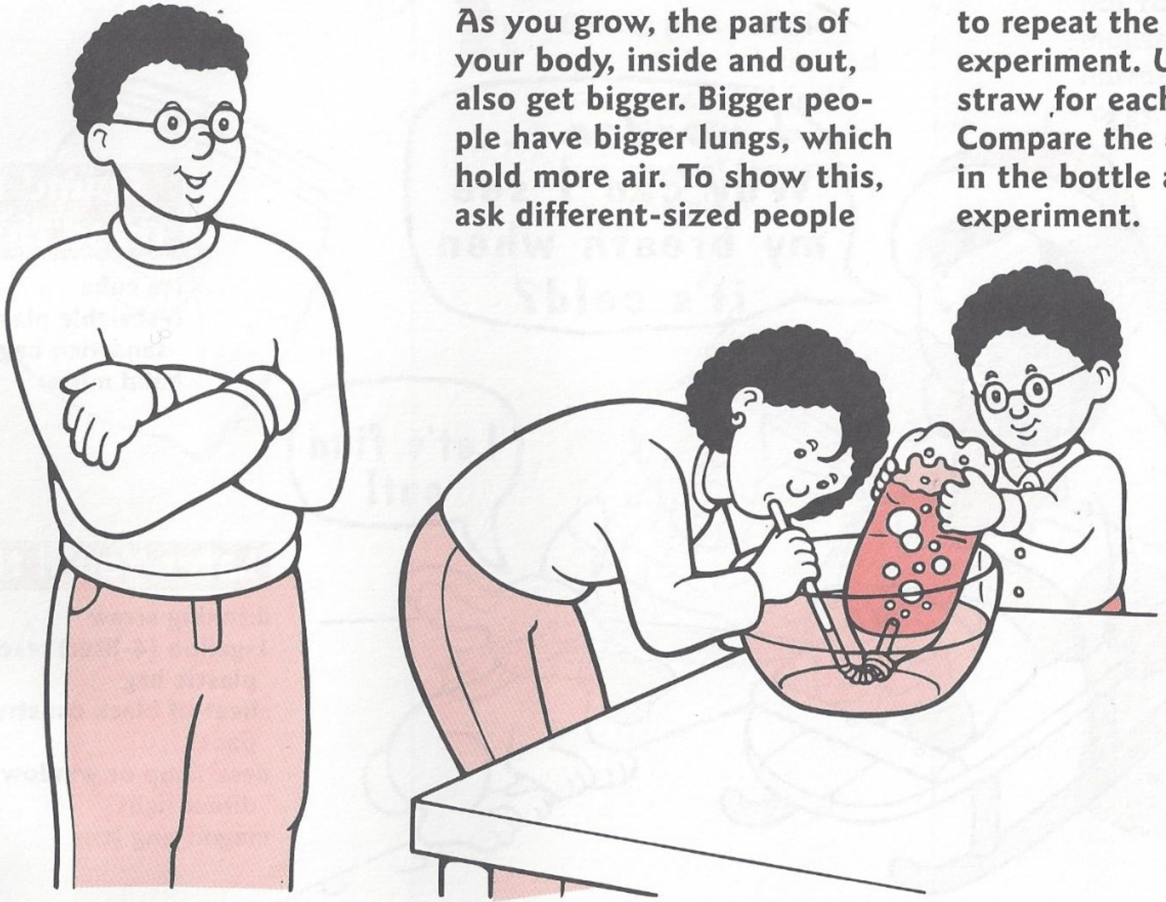
So Now We Know

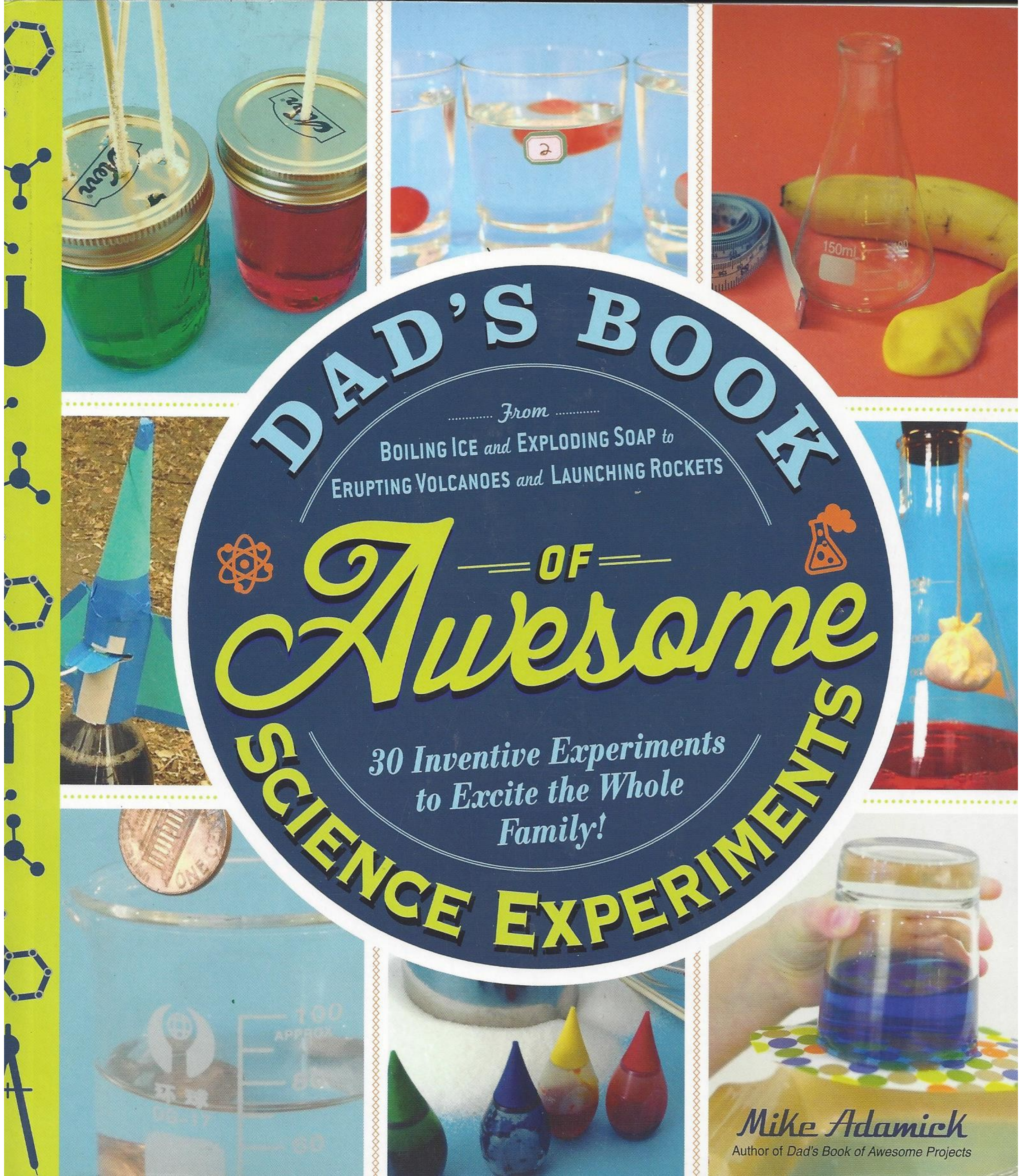
You can see at the top of the bottle how much air you exhale, or breathe out, in one breath.



More Fun Things to Know and Do

As you grow, the parts of your body, inside and out, also get bigger. Bigger people have bigger lungs, which hold more air. To show this, ask different-sized people to repeat the previous experiment. Use a clean straw for each person. Compare the amount of air in the bottle after each experiment.





DAD'S BOOK OF *Awesome* SCIENCE EXPERIMENTS

From
BOILING ICE *and* EXPLODING SOAP *to*
ERUPTING VOLCANOES *and* LAUNCHING ROCKETS

30 Inventive Experiments
to Excite the Whole
Family!

Mike Adamick
Author of *Dad's Book of Awesome Projects*

BLIND BALANCE

You don't need an expensive kit or new toy for supercool science experiments. You already have the coolest, most high-tech science lab in the world.

How, you wonder? *Where*, pray tell, is this fancy, supercool science lab?

Well, look in the mirror.

Your body is one of the best science experiments out there. That's right, your body. It's pretty awesome.

Ever vomited or at least felt dizzy on a roller coaster? Ever taken a road trip and felt carsick? Or went sailing and became seasick? Elevators, for some reason, get me every time.

Your body is constantly at work to keep you balanced, and sometimes signals from your eyes, ears, and muscles overwhelm your body, causing dizziness or, at the very least, imbalance.

This super-fast, fun experiment shows how balance works and questions whether you can remain balanced with your eyes closed—a query that requires no equipment at all. You're just going to stand there. It's the perfect schoolyard experiment or challenge for your little lab partner.

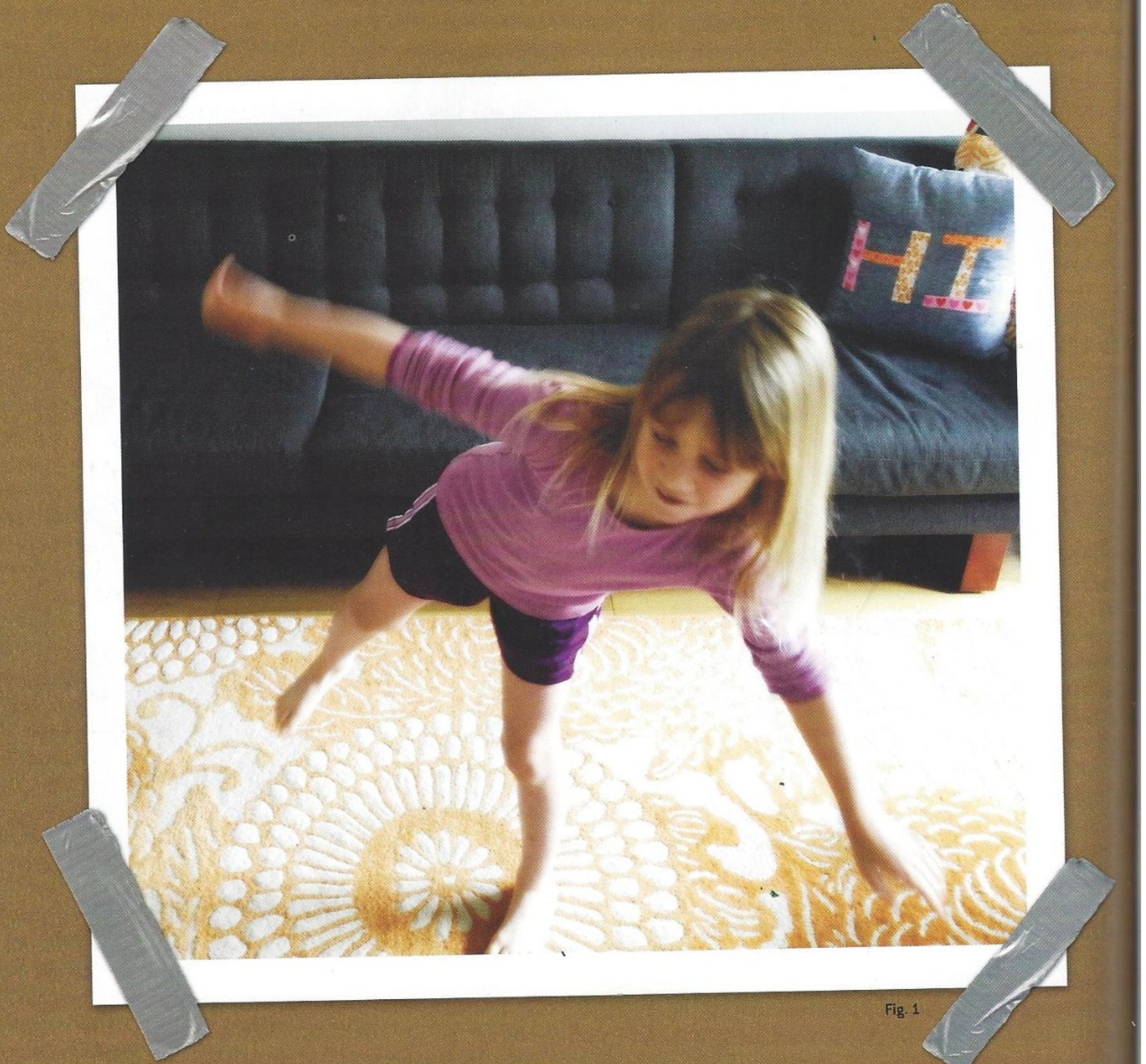


Fig. 1

HERE'S WHY IT WORKS

The human body is an incredible instrument that is designed to keep you upright and balanced. There are lots of tiny functions at work in your eyes, your ears, your muscles, and your nerves when you try to stay balanced. They work in harmony to sense changes and then react to them to keep you upright.

You might be wondering about your ears. How does hearing have anything to do with balance? Well, your ears do so much more than simply translate sound waves into nerve impulses that your brain then translates into the jibber-jabber of everyday life. You see, deep within your inner ear are two jelly-filled sacs that help regulate your balance. Tilt your head one way, and the jelly oozes against tiny hair sensors, which then transmit nerve impulses to your brain, basically saying, "I'm moving!" Tilt your head the other way, and the jelly oozes in the other direction and your brain gets another signal altogether. Another way to envision this system is to find a level, one of those construction tools used to determine whether surfaces are flat. See how the bubble and water inside the level move? That's like what's inside your ear. Sorta. (It's interesting to note that these sacs also contain tiny crystals as well, so the next time someone jokes, "Is your head full of rocks or something?" you can say, "Well . . . sort of!" It's also interesting to note that this usually doesn't stop the jokes.)

Things like carsickness or seasickness come from when your ears and eyes—which also send your brain signals about where you are in relation to the world and whether you're moving—simply get overwhelmed by stimuli. If you're riding in a car and reading a book or, say, can't see past the front seat, your ears tell your brain that you're moving. But your eyes tell your brain that you're standing still and reading or staring at something that is not moving, the seat in front of you for instance. Medical researchers say it's helpful to stare at the road ahead when feeling motion sickness, so your eyes and ears can both sense movement.

HERE'S WHAT YOU NEED

- ☐ A lab partner. That's it. You guys are science all-stars.

HERE'S WHAT YOU DO

1. This is easy. Tell your lab partner to stand on both feet for 30 seconds. *(See Fig. 2.)* Easy peasy, lemon cheesy.

2. Now have her close her eyes and remain standing on both feet for 30 seconds. *(See Fig. 3.)* Still easy? Difficult? Give her a moment to write down her findings or talk about them. Some kids can stand straight up. Some will bob and weave. Some may tumble. All bodies are different, and there's no right way to do this—just have fun.

3. Okay, now it's going to get a little tricky. Have her stand on one leg for 15 seconds with her eyes open and nothing for support. *(See Fig. 4.)* Easy? Difficult?

4. Now have your partner try closing her eyes again and stand on one leg for 15 seconds with no support. Be honest. Could your partner do it? Could you? Did you crash into the couch? Take out the dog? *(See Fig. 1.)*

5. Now, try standing on one leg with your eyes closed and time yourself to see how long you and your lab partner can last without tipping or putting your other foot down.

6. Now try standing on one leg close to a wall. Keep your eyes closed but use one finger to touch the wall. This usually helps give you some balance, but again, all bodies are different, so go investigate.

7. Finally, have your lab partner stand with his legs spread apart and give him a little shove sideways. Now have him put his legs close together and then give another gentle shove from the side again. He might notice that with his legs spread, he has a lot of balance and stability, but with his legs close together . . . look out!

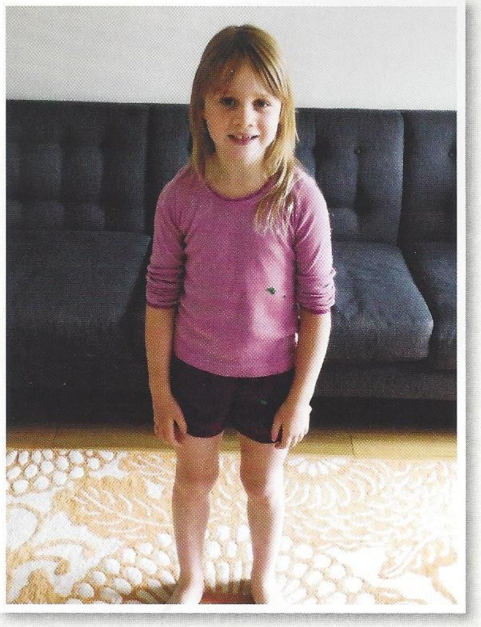


Fig. 2

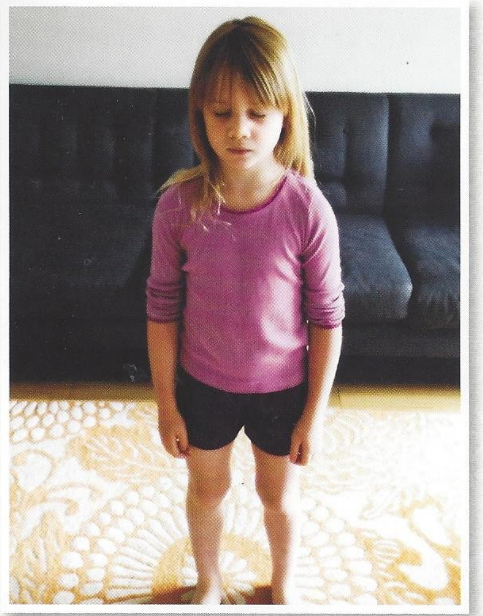


Fig. 3

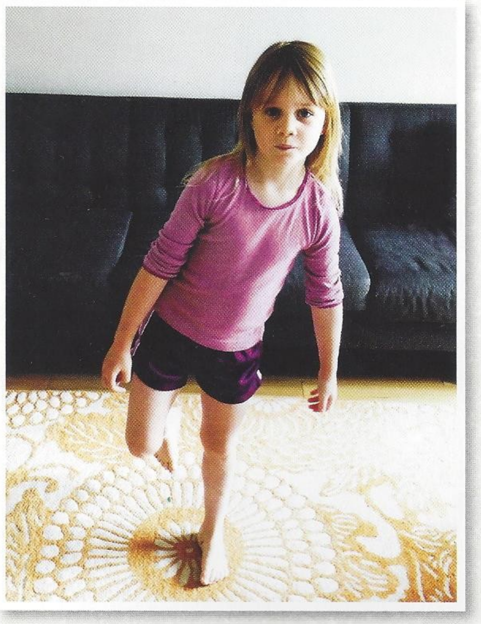


Fig. 4

DID YOU KNOW?

For thousands of years, people have believed that eating ginger can cure motion sickness, although it seems the research is still out on that one.

Janice VanCleave's

The Human Body for Every Kid

Easy Activities that Make Learning Science Fun

John Wiley & Sons, Inc.
New York • Chichester • Brisbane • Toronto • Singapore

5

Balancing Act

How Your Body Maintains Its Balance

What You Need to Know

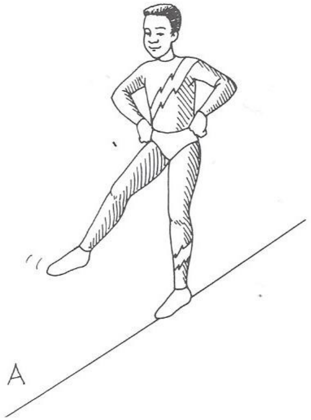
The cerebellum is about the size of a pear and is located below and to the rear of the cerebrum. One of the duties of the cerebellum is to coordinate your movements when the cere-

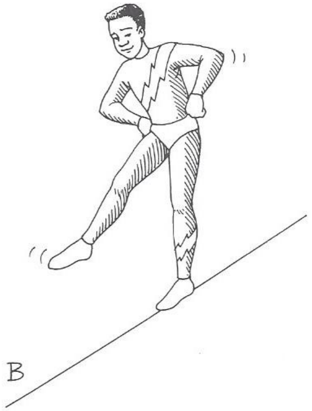
brum gives the command. This is important for such activities as walking, running, writing, or playing ball. When you throw a ball, the decision to throw the ball and the direction in which to throw it comes from the cerebrum. Then, the cerebellum receives messages from body parts such as ears, eyes, and muscles. It uses all this information to coordinate the movements of your fingers, hand, and arm so that their motion is smooth and accurate.

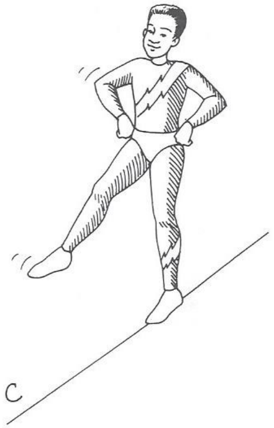
Another duty of the cerebellum is to help you maintain your sense of balance. The body stays balanced as long as its **center of gravity** (point at which an object balances) does not extend past its foundation (the feet). The cerebellum orders and processes split-second actions that require no thought. If you slip on a banana peel while walking, your body starts to fall backward because your center of gravity changes. A message of this movement is sent to the cerebellum, which in turn sends messages to the correct muscles. The muscles respond properly by shifting your body in the opposite direction—forward—so that you regain your balance. Imagine having to ask yourself, Which muscles should I contract? Which muscles should I relax? Where should my arms and hands be held? If these decisions were not made fast enough, you would fall and possibly injure yourself. But because the cerebellum can make speedy decisions, the right messages are sent to each muscle and you regain your balance.

Exercise

A tightrope walker lifts his leg to the side. Which diagram on the next page shows the position that will most likely result in keeping his body balanced so that he does not fall?


A


B


C

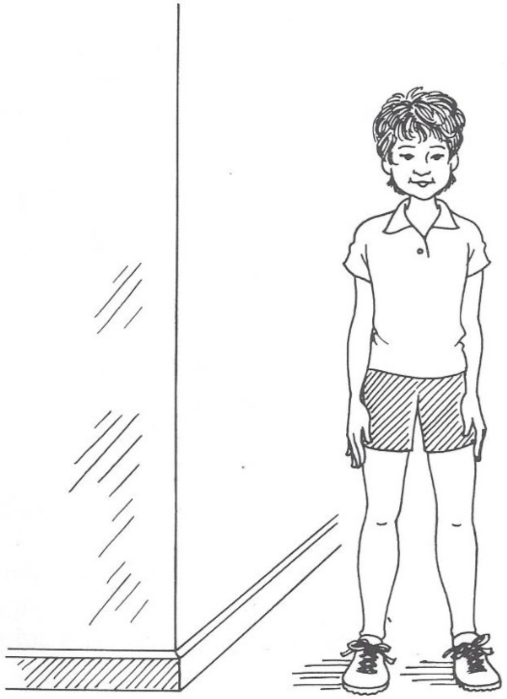
Activity: IN THE WAY

Purpose To demonstrate the body's automatic balance responses.

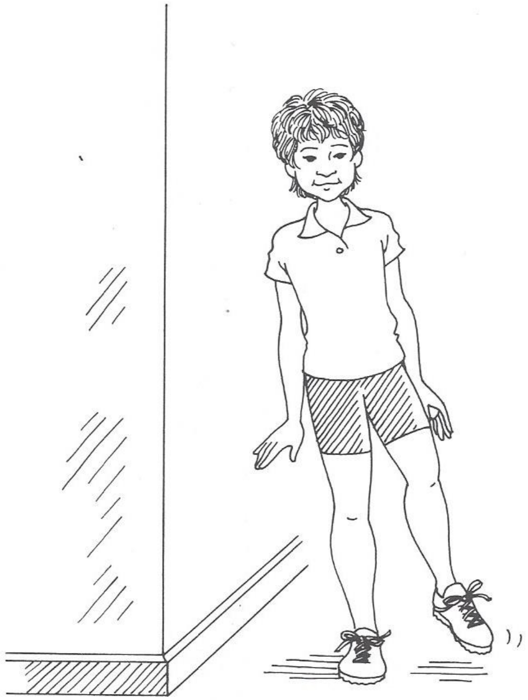
Materials wall

Procedure

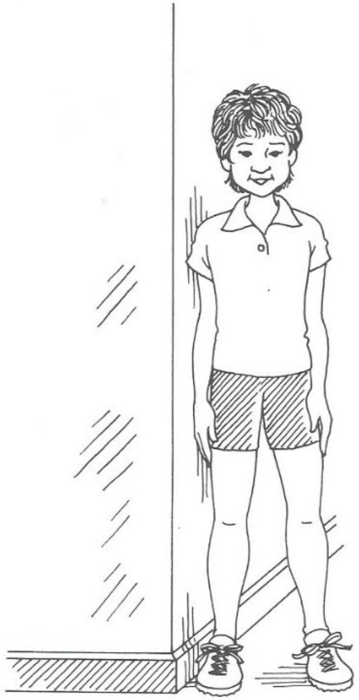
1. Stand away from the wall with your feet about 12 inches (30 cm) apart and your arms held to your sides.



2. Bend your left knee so that your left foot is lifted about 4 inches (10 cm) above the floor.



3. Return your foot to the floor and move next to the wall.
4. Stand as before with your feet about 12 inches (30 cm) apart and with your right foot and right shoulder against the wall.
5. Again, bend your left knee so that your left foot is lifted about 4 inches (10 cm) above the floor.



Results You can bend your knee and raise your foot without being off balance when you are not standing next to the wall. When standing next to the wall, you will fall over if you raise your foot.

Why? Raising the left foot causes the body's center of gravity to extend past the body's supportive foundation—the foot on the floor. The body automatically leans slightly to the right to redistribute the body's weight and again place its center of gravity over the supportive foot. When standing next to the wall, the body is prevented from leaning to the right, so you cannot balance at all with your foot raised.

Signals to lift the foot are sent by the cerebrum to the cerebellum. As the body action is carried out, other signals from the body are sent to the cerebellum. The cerebellum compares all this information. If a movement would cause the body to be off balance, the cerebellum sends signals to the cerebrum, which then sends appropriate corrective signals to the muscles. Thus, the foot is used to keep your body balanced. You can concentrate and lift your foot, but it will quickly return to its original position to prevent your body from falling.

Solution to Exercise

Think!

- Lifting the leg causes the body's center of gravity to shift past its supportive foundation—the foot on the tightrope.
- How can this shift be corrected? By leaning in a direction opposite that of the raised leg.

Figure C shows the position that will result in keeping the tightrope walker balanced.

Science For Kids
39 EASY ANIMAL BIOLOGY EXPERIMENTS

Robert W. Wood

Illustrated by Steve Hoeft

TAB
TAB BOOKS
Blue Ridge Summit, PA

Experiment

26

How Much Air Do the Lungs Hold

Materials

- CLEAR JAR
- RUBBER TUBING
- CRAYON MARKER
- QUART MEASURING JAR
- WATER
- SINK

Fill the sink with water and submerge the jar, about 1/2 gallon in size, in the water with the open end up (Fig. 26-1), completely filling the jar with water. Try to get all of the air out of the jar. Turn the jar upside down, still under water. Insert one end of the rubber tube, which should be about 2 feet long, into the jar, leaving the other end above the surface. Take a normal breath and breathe out into the free end of the rubber tube (Fig. 26-2). You want to capture your breath in the jar. Your breath will push some of the water out of the jar. Use the crayon to mark the water level on the jar (Fig. 26-3). Empty the jar and place it upright on a table. Fill the

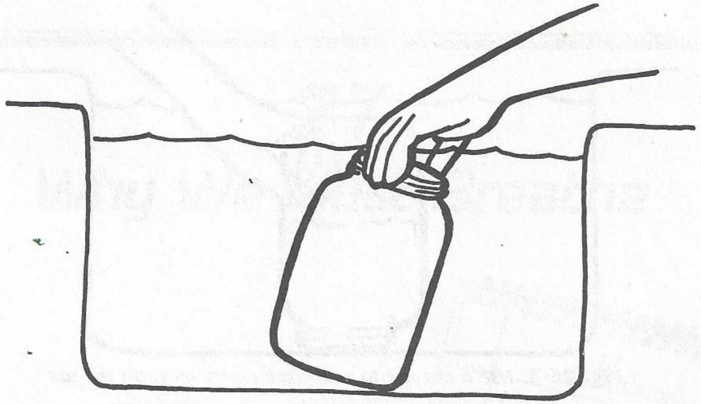


Fig. 26-1. *Submerge the jar in the sink of water.*

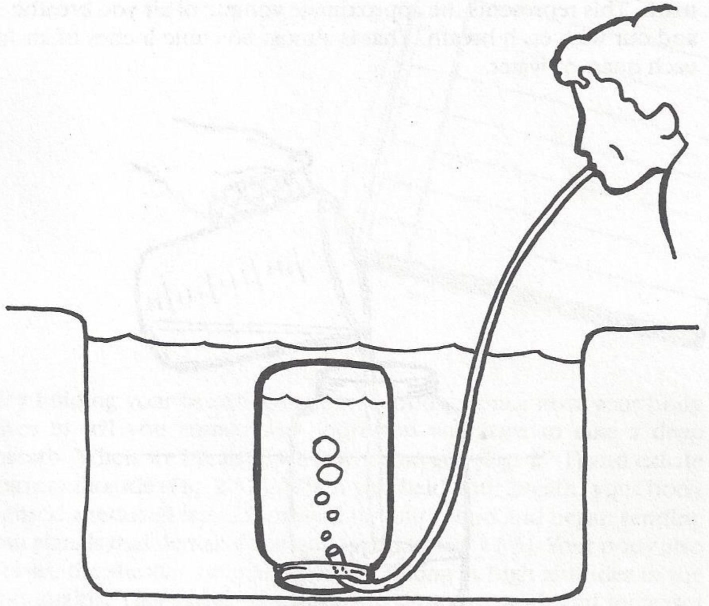


Fig. 26-2. *Breathe into the tube to capture your breath in the jar.*

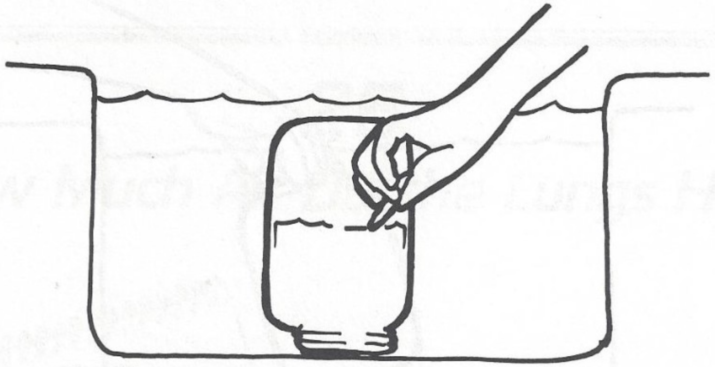


Fig. 26-3. *Use a crayon to mark the water level on the jar.*

measuring jar with water, and pour it into the larger jar (Fig. 26-4). Measure the amount of water it takes to bring the water up to the mark. This represents the approximate volume of air you breathe in and out with each breath. That is almost 60 cubic inches of air for each quart of water.

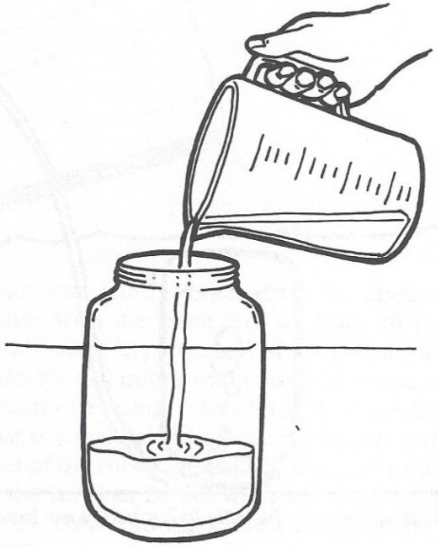
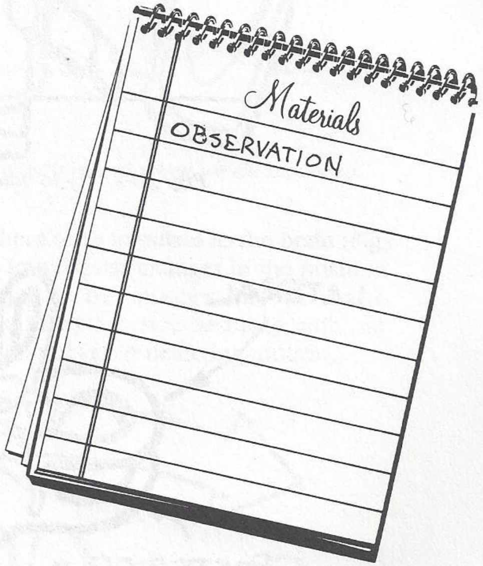


Fig. 26-4. *The amount of water represents the volume of air in your breath.*

Experiment

38

Our Sense of Balance



Spread your arms out and try to stand on one foot. Use your arms and the other leg to keep your balance (Fig. 38-1). You will find that looking straight ahead and concentrating on a point will help. With a little practice, you should be able to stay balanced for some time. Try it with your eyes closed. It should be very difficult, even for a few seconds.

Our eyes are very sensitive to movement, and without them, we have to depend on three fluid-filled semicircular canals in our inner ear (Fig. 38-2). When we tilt our head, fluid moves much like water moves when you tilt a glass (Fig. 38-3). This causes changes in

Fig. 38-1. Try to balance on one foot.

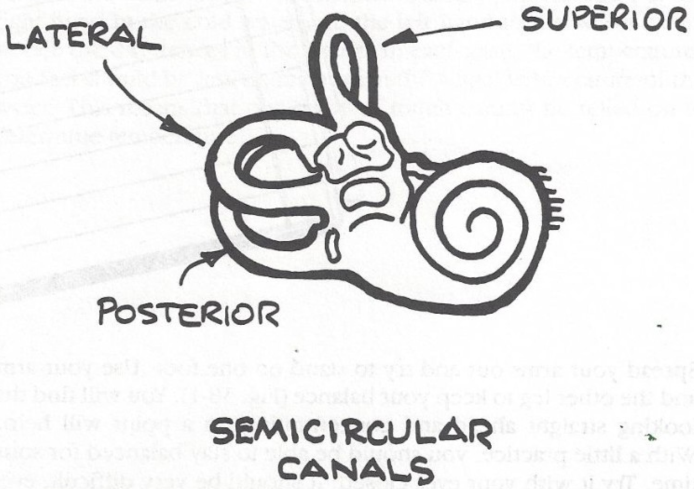


Fig. 38-2. There are three fluid-filled canals in our inner ear.

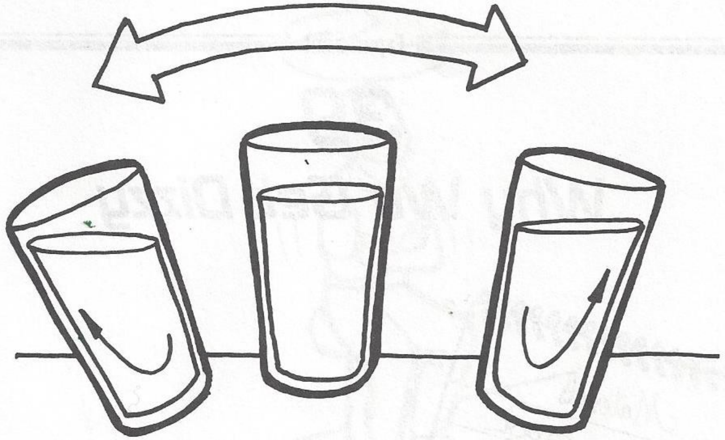


Fig. 38-3. The fluid in the canals moves when we tilt our head.

pressure in the canals. Nerves here send impulses to the brain (Fig. 38-4). The brain interprets the impulses as changes in the position of the body, and sends messages to the muscles that we use to maintain our balance. But, it is difficult to stay balanced with our eyes closed because our eyes are quicker at detecting motion.

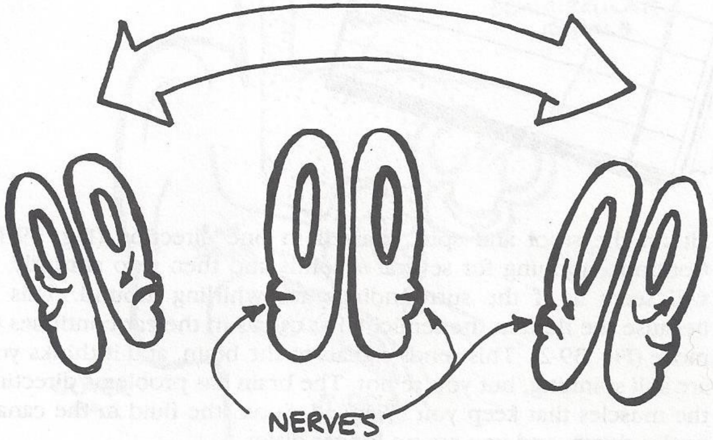


Fig. 38-4. *Nerve endings in the canals send signals to the brain.*

Experiment

39

Why We Get Dizzy

Sit on the stool and spin yourself in one direction (Fig. 39-1). Continue spinning for several seconds and then stop abruptly. It will seem as if the surroundings are whirling around. This is because the fluid in the semicircular canals in the ear continues to move (Fig. 39-2). This sends signals to the brain, and it thinks you are still spinning, but you're not. The brain has problems directing the muscles that keep you balanced. Soon, the fluid in the canals settles down, and you are no longer dizzy.

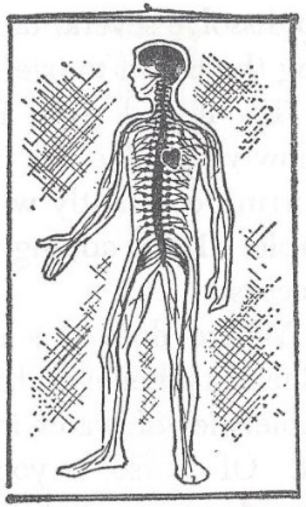
Fascinating Science Experiments for Young People

GEORGE BARR

Illustrated by
Mildred Waltrip

DOVER PUBLICATIONS, INC.
New York

YOUR BODY



How fast is your reaction time?

Your body is alert to many things that stimulate your senses. Some examples are heat, sound, light, pain, odor, taste, and pressure. When your body responds to these in some muscular manner, it seems to do so immediately. However, a fraction of a second usually elapses between the stimulating affect and the response of your muscles. This interval is called REACTION (ree-AK-shon) TIME.

There is a wide variation in reaction time among your friends. Indeed, reaction time for the same individual may vary during the day. Fatigue, hunger, worry, sleepiness, lack of interest, or even overeating can make a person more sluggish. Remember too, that reaction time may vary for different actions. Blinking an irritated eyelid is different from pressing an automobile brake pedal during an emergency.

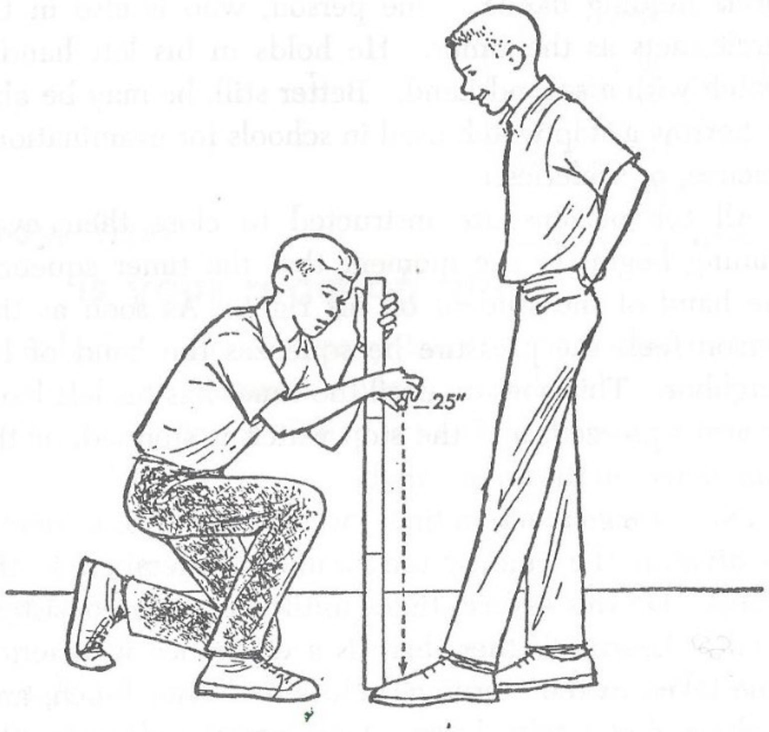
You can test the reaction time of your friends and classmates by several simple means. The following method gives the average reaction time of people in a group and can be done in the classroom.

Everybody, including the teacher, stands in a large circle holding hands. One person, who is also in the circle, acts as the timer. He holds in his left hand a watch with a second hand. Better still, he may be able to borrow a stop watch used in schools for examinations, science, or athletics.

All the persons are instructed to close their eyes. Timing begins at the moment that the timer squeezes the hand of the student on his right. As soon as this person feels the pressure he squeezes the hand of his neighbor. This goes on until the timer has his left hand or arm squeezed, and the stop watch is stopped, or the time noted on the wrist watch.

The average reaction time for each person is obtained by dividing the time by the number of members in the group. Do this several times until you get a consistent result. Learn whether there is a difference in reaction time taken in the morning, before and after lunch, and at the end of a school day. Does practice decrease the reaction time? To find out, do the above experiment every school day for two weeks.

Another method of testing reaction time is to drop a coin, small ball, or marble from different heights over the foot of a person facing you. He has a clear view of the object, but he does not know exactly when you will suddenly release it over his foot, which is thrust out on the floor. He is supposed to remove his foot, so that it is not struck.



Hold the object to be dropped between the thumb and forefinger of one hand. Hold a yardstick vertically with the other hand to measure the distances. Find the lowest distance the subject can avoid the falling object three times in five.

This method of testing reaction time depends upon the scientific fact that when objects fall to earth they do so at a certain rate of speed. Disregarding air resistance, for every second of free fall, the speed of an object increases 32 feet per second. It is therefore possible to calculate the time it takes for an object to fall a certain distance. The following table is based upon this principle:

REACTION TIME (IN SECONDS)	HEIGHT OF DROPPED OBJECT (IN INCHES)
.15	4
.20	8
.25	12
.30	17
.35	24
.40	31
.45	39
.50	48
.60	69

Keep reaction time records of many of your friends. Try to find answers to questions such as the following: Do those with faster reaction time have better school averages? Do older people get poor scores? Remember to use many cases before drawing conclusions.